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Abstract

ENERGY REQUIREMENTS AND THE ROLE OF NUCLEAR POWER

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The paper analyses some of the latest information in regard to the growth of energy demands in the world as a whole and the resources of conventional and nuclear fuels. It is found that planning will have to be made on the basis that economically exploitable conventional resources may not support demands beyond the foreseeable future and large quanta of nuclear power will be required. Some quantitative estimates are also provided. A regional analysis is then made for the various areas of the world and it is found that the so-called underdeveloped regions will have an even greater specific need for nuclear energy than other areas due to the relative shortage of conventional fuel as compared with potential demands. The new economic data relating to various types of nuclear and conventional stations is examined.

Finally a detailed examination is made of the latest situation in India with regard to conventional and nuclear power, their relative costs in the different areas of the country and the growth in power and energy demands in the country. Cost information is presented on the Tarapur Atomic Power Station and detailed cost break-down and power costs are furnished for the Rajasthan Atomic Power Station and other stations based on heavy water-type reactors to be built in India which will provide, in the main, for the first stage of the nuclear power programme. Potential developments in the costs of these reactors are also discussed. It is shown that nuclear power is now decidedly more economical in certain areas of the country as compared

with conventional thermal power based on either oil, coal transported by rail or pit-head generation plus long distance EHV transmission. The contribution of nuclear power is expected to rise from 1.2 million kilowatts of installed capacity by the end of the fourth plan (1970-71) towards a demand of 10 million kilowatts by the end of the sixth plan (1980-81), some 20 million kilowatts by 1986, and an increasing amount thereafter. (The installation rate for nuclear power is expected to be almost 400 MW per annum in the fifth plan period (1971-76) and approaching one million kilowatts per annum between 1976-81). The manner of meeting these requirements is discussed from the point of view of fuel cycles, as also the development of supporting facilities.